



# User's manual

Agecodagis SARL

Version 15 - November 2006

# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
1.1	Signal digitisation . . . . .	2
1.2	Power consumption . . . . .	3
<b>2</b>	<b>Physical specifications</b>	<b>4</b>
<b>3</b>	<b>The Osiris DAS in the field</b>	<b>7</b>
3.1	Internal battery . . . . .	8
3.2	Mass storage . . . . .	8
3.3	Wireless lan interface . . . . .	9
3.4	DAS identification . . . . .	9
3.5	Time control . . . . .	9
<b>4</b>	<b>Connecting to the Osiris DAS</b>	<b>10</b>
<b>5</b>	<b>Data management</b>	<b>11</b>
5.1	Signal monitoring . . . . .	11
5.2	SeedLink connectivity . . . . .	11
5.3	Retrieving data . . . . .	12
5.4	Writing your own software . . . . .	13
<b>A</b>	<b>Connector pinouts</b>	<b>14</b>
A.1	Environemental sensors . . . . .	14
A.2	Power . . . . .	14
A.3	Ethernet . . . . .	14
A.4	Serial . . . . .	15
A.5	Sensor . . . . .	15
A.6	GPS . . . . .	16
<b>B</b>	<b>Summary of the Osiris parameters</b>	<b>18</b>
<b>C</b>	<b>Uploading the ARM software</b>	<b>21</b>
C.1	Using the serial line (Linux-i386 only) . . . . .	21
C.2	Using osh . . . . .	22
C.3	Using a disk . . . . .	22
<b>D</b>	<b>Filters</b>	<b>23</b>

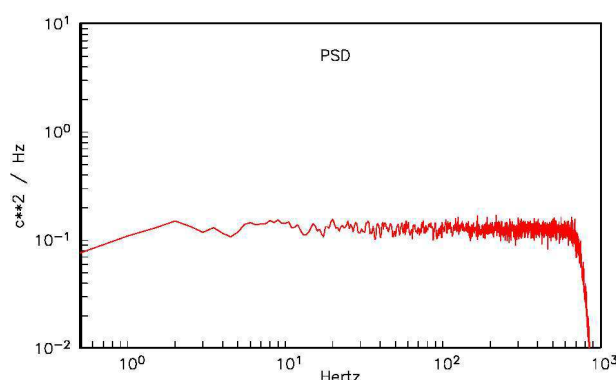


Figure 1: PSD of the electronic noise measured at 2kHz.

<b>E</b>	<b>Logfiles</b>	<b>24</b>
E.1	Osiris log file . . . . .	24
E.2	System messages file . . . . .	25

## 1 Introduction

Osiris stands for Open Seismological Integrated Recorder for Improved Survey. Osiris DAS is a low power digitizer and datalogger for seismological and seismic applications. It has been designed to be used in rude environments, for long term survey or short term deployment. The embedded system is based on open standards and thus allows any user to develop his own applications to make Osiris a real-time remote laboratory for signal processing, triggering, data management etc.

This documentation refers to the version 15 of the Osiris software and version 1 of the Osiris DAS.

### 1.1 Signal digitisation

The first stage of the digitisation is performed by a  $\Sigma/\Delta$  24bit ADC (ADS1251) which samples the continuous signal at 6.144Mhz and decimates it down to 16kHz (8kHz for the 24 channel version). The DSP then decimates the signal down to 2kHz. The spectrum in Figure 1 represents the measured PSD of the electronic noise for this input level, it remains at an insignificant level compared to the full scale range (sampled at 2kHz, 24000 samples).

The user-defined sampling frequency is obtained using several decimation filters of order 5 and 2. The user defined frequency ranges from 1Hz to 2kHz

according to the following formula:

$$F = \frac{2kHz}{(2^n \cdot 5^m)}, n \leq 4, m \leq 3, F \geq 1Hz$$

See Appendix D for the full description of these filters.

The dynamic range achieved by the Osiris DAS is 128dB at 100sps and 117dB at 1000sps, those values correspond to a noise level of 3.2bits at 100sps and 4.8bits at 1000sps (24bits-ENOB). These values are given for an input level without amplification. The Osiris DAS proposes up to 4 input level gains which are factory-defined on the request of the customer. Note that the dynamic range is slightly lower for the 24 channel Osiris version.

## 1.2 Power consumption

The internal design of the DAS, based on a DSP microcontroller coupled with a ARM processor allows for an intelligent power management. This task is assumed by the software which takes care of turning off any unused device (mass storage, GPS, communication device, etc.). Table 1 gives the measured power consumption for various usages at 100 and 1000sps for 6 channels.

Thanks to the use of an internal data buffer of 10Mb, the disk activity is reduced to less than 5 seconds per hour at 100sps (average for 6 channels). The data are flushed to the mass storage medium only when the internal data buffer filling rates reaches 80% and the mass storage medium is turned off as soon as this operation is completed. The acquisition software is designed to bypass the internal buffer and directly write the data on the mass storage medium if the data flow requires a permanent flush (high sample frequency

componenent	power
6ch@250sps	1,2W
GPS	0,9W
Wireless lan	1,6W
CompactFlash (writing)	120mW
MicroDrive (writing)	480mW
PCMCIA HD	1,44W
low power mode	780mW

Table 1: Typical measured power consumptions of the Osiris DAS

and/or high channel number). The optional communication devices (PCM-CIA devices) are also controlled by the embedded software and can be turned on/off on user request.

## 2 Physical specifications

The Osiris DAS is packed in a single case containing both the digitiser and the datalogger in order to make the transport, storage and manipulation easy. The case is a Pelican 1300 Pelicase (R), it is a light-weight and robust case, compliant with the IP67 standard.

**Volume** : 270x250x170

**Weight** : 3.5kg

### IP67

Figure 2 shows some views of the Osiris DAS. The dimensions are small and the cases offer the possibility to be piled up, remaining locked thanks to the reliefs on the top and bottom. The connectors are located on the back face of the case, protected by the lateral relief of the case (see Figure 3). The connector set follows the standard HE301, MIL-C 26482G (IP68) (see Appendix A for the pinouts):

**power supply** : 85107 A 8 - 3 pins

**sensor** : 85107A 14 - 12 pins, 1 connector per 3 channels

**ethernet** : 85107 A 12 - 8 pins

**RS232** : 8510 A 12 - 10 pins

**antenna radio** : N

**GPS** : 85107 A 10 - 6 pins

**environment monitoring** : 85107 A 12610W 10 pins

The top face shows a panel with a figure representing the connector location with their usage (Figure 3, bottom left) and a status panel (Figure 4). The led panel is turned off in normal operation (to reduce the power consumption),



Figure 2: Top and bottom left: Front and top views of the Osiris DAS showing the handle on the front face. Bottom right: back view of the case showing the connectors protected by the relief of the case.



Figure 3: Back face presenting the connectors with the map indicating the connector usage.

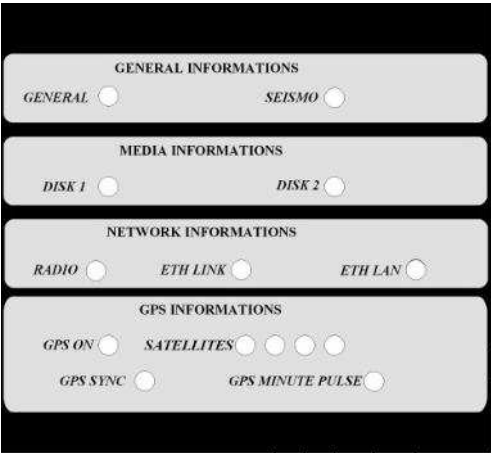


Figure 4: Top face showing the connector usage and the LED-based status publication panel.



Figure 5: The internal panel: the WiFi/mass storage slots LED activity and the maintenance keys.

when the user wants to know the state of the DAS, he just gives a small knock on the panel to turn on the led panel, switch the GPS on and wake up the radio card (if any).

The choice of a led-based panel instead of an LCD panel allows a clear understanding of the information even in difficult operating conditions (darkness, humidity, direct sun exposure...).

When the case is open, a panel protecting the internal part of the station from the projections of water, mud, or small objects appears (Figure 5).

The panel also supports the slots used for the mass storage media or a PCMCIA communication device (modem, radio modem, WiFi...). Two leds inform the user that the corresponding mass storage medium is presently used. When the led is off, the user can remove the medium. Unplugging the medium when the led is on cause damages to the medium and can result in an unreadable disk. Three maintenance buttons are also available on the internal panel. They should not be used during the normal operation of the DAS. 'DSP upload' and 'ARM upload' are used to upgrade the firmware of the DSP or the ARM (respectively). 'Default param' resets the configuration to the factory defined set of parameters and also reformat the flash storage area (when pressed during powerup). Finally two switches are used to select the operating mode of the GPS (presently, only the 'Hard' mode should be used) and to completely disconnect the internal LiOn battery (for long term storage).



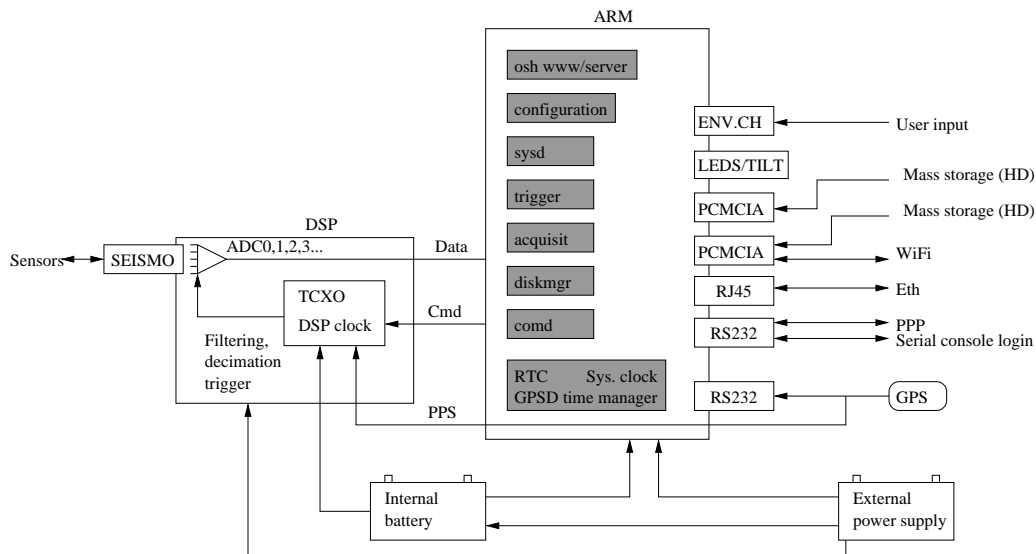


Figure 6: Overview of the Osiris DAS internals and software.

### 3 The Osiris DAS in the field

Figure 6 shows the two-processor architecture of the Osiris DAS and illustrates the relations of the different components.

#### 3.1 Internal battery

The Osiris DAS is equipped with a 2900mAh internal battery. The internal battery is charged using the main power supply. It is used provide energy in case of main power failure, to complete a proper shutdown in case of long power failure and to maintain the DSP internal clock.

#### 3.2 Mass storage

The data are first stored on the flash memory area and then transferred to the PCMCIA storage devices.

##### 3.2.1 Flash storage area

The flash storage area is a persistent memory area where the data are stored before being transferred to the storage area. This intermediate step is needed

to reduce the power consumption. If the data transfer rate is too high, the embedded software bypasses the flash memory area and directly saves the data on the PCMCIA storage area. This will occur if the total number of samples per second is higher than  $6 \times 1000$ .

### 3.2.2 PCMCIA storage area

The data files are finally stored on the PCMCIA mass storage plugged in one of the two slots available in the Osiris DAS. Remember that removing the PCMCIA device from the slot while the activity led is ON may cause serious damages to the device and leave the DAS in an unstable state.

## 3.3 Wireless lan interface

The Osiris DAS has been successfully tested with PCMCIA wireless cards based on the Prism2.5 chipset. Support for these cards is included in the standard Osiris system.

## 3.4 DAS identification

Each Osiris DAS has a unique serial number written on the case. This serial number is used as `HOSTID`. The `HOSTID` is the system level DAS identification it is computed by the system and is always unique. The MAC address of the `eth0` interface defines the IP addresses of the DAS.

The IP addresses of the network interfaces of any Osiris DAS are automatically defined at boot time. During normal operations, the IP address used for each station is directly derived from the serial number: the Osiris DAS AABBCB has the IP address 10.AA.BB.CC

The full serial number/IP address table is published online on <http://www.agecodagis.com> (Support... Documentation... Osiris).

## 3.5 Time control

The timing accuracy for the Osiris DAS is better than  $1\mu\text{s}$ , which is typically the GPS time accuracy. The internal clock is based on a TCXO quartz (temperature constrained clock), the stability of the TCXO is  $\pm 1\text{ppm}$ . The drift for the internal clock is  $10^{-6}$ . Since the ADC (one per channel) operate synchronously, the channel to channel skew is zero.

The propagation time through the decimation filters is given by the following formula:

$$\delta T = \frac{127}{32000} + (4 * 5^m * 2^n - 3 * 5^m - 1) * \frac{126}{16000}$$

$n$  and  $m$  refer to the numbers of decimations of order 2 and 5, respectively.

The latest version of cvtit takes into account these delays.

The GPS receiver provides a continuous time signal over a NMEA connection (open standard GPS protocol communication). A specialised daemon running on the ARM processor uses this time information to synchronise the system clock as well as the real time clock of the ARM processor. Once per minute, the GPS daemon lets the time signal propagate to the DSP. This time pulse is used by the DSP to time stamp the data flow which are sent back to the acquisition software. This process allows for a very robust time management for the DSP as well as for the ARM part of the system. The acquisition software and the GPS daemon both log the time information allowing for a full *a posteriori* control of the time-stamp process.

### 3.5.1 Hardware real time clock, no-GPS mode

The Osiris DAS is equipped with a hardware real time clock (RTC). The RTC is set to the GPS time when a valid time information is received. When the system starts, the RTC time is used as a first estimation of the time (the accuracy of the RTC is 1s). The embedded DSP on the other hand is equipped with a very accurate ( $10^{-6}$ s) TCXO-based clock. The use of both clocks allows for the computation of the absolute time that will be used in the data stream.

If the main power is suspended with the power supply connector still plugged in the Osiris DAS, then the DSP will maintain its internal TCXO clock using the internal battery. The time drift thus remains continuous and the DAS can be used later without GPS since the DSP remains informed of the time.

Note that in order to benefit this feature, the switch controlling the internal battery must be in the 'ON' position.

## 4 Connecting to the Osiris DAS

Osiris accepts connections on all its active network interfaces on the ports 23 (telnet), 80 (osh WWW interface), and 2323 (osh interface). An ssh server is also available and ready to be installed on Osiris if required.

The osh server listens the port 2323, a single session implements the full osh protocol for remote connections, allowing the configuration and data management.

A SeedLink server is embedded in Osiris, the server is listening port 18000 and serves only the real-time data requests. Please refer to section for details.

## 5 Data management

Data are stored in files encoded in TITAN2 format. The release 7.9 (or later) of `cvttit` is able to correctly read this format and to convert the data in various commonly used seismological data formats.

### 5.1 Signal monitoring

A java applet is embedded in Osiris, it can be used to monitor the data streams in real time. The monitor flow is limited to a maximum of 2000 samples/s over the total number of channels, e.g. at 500Hz, no more than 4 channels are available.

The same applet can be used to monitor several DAS (multi station monitoring), this feature absolutely requires the use of a 1.4 JRE, any previous version won't allow the multi station monitoring. The multi station monitoring is simply activated by starting the monitor applet from the first DAS and then connecting to the other DAS and asking for the data without restarting the applet. Note that as the DAS will contact the applet, the applet IP address should be reachable on port 2004 from the DAS.

Please check that your system is correctly configured to run java plugins using the following tool: <http://www.java.com/en/download/help/testvm.jsp>.

### 5.2 SeedLink connectivity

The SeedLink server embedded in Osiris provides a simple way to connect an Osiris DAS to an Earthwork system, or any similar data management system implementing a SeedLink client. The SeedLink server listens on port 18000. The default names for the channels are 'C00' to 'C23' and the network and location are set to 'AG' and '00' (resp.). The parameters 'NetworkName' and 'LocationName' control these names.

Note that the station name stored in the MiniSeed blockettes will be truncated to the first 5 characters of the parameter 'StationName'.

The following command line starts SeisGram (<http://alomax.free.fr/seisgram/seedlink/>) in Seedlink mode and monitors the stream AG\_TEST:C?? from the Osiris DAS with address 10.64.0.10:

```
java -jar SeisGram2K40.jar \  
      -seedlink "10.33.0.10:18000#AG_TEST:C??#120"
```

Please refer to the following links for more information about Seedlink:

- SeisComP:  
<http://www.gfz-potsdam.de/geofon/seiscomp/welcome.html>
- MERIDIAN:  
<http://orfeus.knmi.nl/meredian/>
- Java SeedLink implementation:  
<http://alomax.free.fr/projects/seedlink/index.html>

## 5.3 Retrieving data

The recommended way to get the data stored on an Osiris DAS is using the html interface or the `data extract` commands of osh.

### 5.3.1 Data transfer with the osh command line interface

The following command, issued in a `oclient` session asks for the data stored on the storage disk corresponding to the time range 2004/07/01-16:00:00 to 2004/07/01-17:00:00, on channels 0 to 2

```
connect [station]  
data extract=storage,2004/07/01-16,2004/07/01-17,0-2 > data.tit
```

Note that since version 006, the 'auto' pseudo-device can be used in stead of 'storage' or 'flash'. In this case, the system will first look for the beginning of the data in flash. On a succesful search, the extract command will run only from flash. The storage disk is used as a fall back if the beginning of the request is not found in flash. Note that in some particular cases, the beginning of the data may be found in flash while the end resides on the storage disk. No mechanism is designed to take into account these particular cases.

### 5.3.2 Data transfer with the osh WWW interface

The 'data management' link in the main page of osh allows to list the files stored on the DAS. Then, the links on the files can be used to store the file on the computer or to directly see the seismograms in SeisGram2K.

Under windows, after the installation of the viewer, the 'TIT' files should be viewed automatically with SeisGram2K. Under Linux, when opening a TITAN file for the first time, Mozilla should ask which application to use, just select /usr/local/bin/viewtitan. Mozilla should remember this setting for the further operations. This has been tested in the Gnome environment, running Mozilla 1.7 (FC2 distribution) with the JRE 1.4 from <http://java.sun.com>

## 5.4 Writing your own software

The real time data are published for the channels sampled at less than 500Hz only. The Osiris library provides the function to be used for accessing these data. `Osiris/Software/SoftArm/OsirisSrc/Src/Tools/UserProc` on the CVS server gives an example of the real time data reading and processing.

## A Connector pinouts

### A.1 Environemental sensors

Reference: 851-06EC-12-10PW50 (10 pins)

Connector Pin	Osiris In/Out	Label
A	Out	Power supply fuse
B	In	DTR DSP board
C		GND
D	Out	RXD DSP board
E	In	Env. chan. 7
F	In	Env. chan. 6
G	In	Env. chan. 4
H	In	Env. chan. 3
J	In	TXD DSP board
K	In	Env. chan. 5

### A.2 Power

Reference: 851-06EC-8-3P50 (3 pins)

Connector Pin	Osiris In/Out	Label
A	In	Save time (to GND)
B	In	Power supply
C		GND

### A.3 Ethernet

Reference: 851-06EC-12-8P50 (8 pins)

Connector Pin	Osiris In/Out	Label
A	Out	TxD+
B	Out	TxD-
C		GND
D	In	RxD+
E	In	RxD-
F		GND
G	Out	Fuse
H	Out	Fuse

## A.4 Serial

Reference: 851-06EC-12-10P50 (10 pins)

Connector Pin	Osiris In/Out	Label
A	In	RI
B	In	CTS
C	Out	RTS
D	Out	Fuse
E		GND
F	In	DCD
G	Out	TxD
H	Out	DTR
J	In	DSR
K	In	RxD

## A.5 Sensor

Reference: 851-06EC-14-12P50 (12 pins), for 3, 6 or 9 channels:

Connector Pin	Osiris In/Out	Label
A	In	S0+
B	In	S0-
C	In	S1+
D	In	S1-
E	In	S2+
F	In	S2-
G	Out	Calibration
H	Out	Mass centering (5V)
J		GND ANALOG
K		SHIELD
L	Out	Power supply
M		GND

Reference: 851-06EC-18-32P50 (32 pins), for 12 and 24 channels:



Connector Pin	Osiris In/Out	Label
A	In	V2- Triplet3
B	In	V2+ Triplet3
C	In	V1- Triplet3
D	In	V1+ Triplet3
E	In	V0- Triplet3
F	In	V0+ Triplet3
G	In	V2- Triplet2
H	In	V2+ Triplet2
J	In	V1- Triplet2
K	In	V1+ Triplet2
L	In	V0- Triplet2
M	In	V0+ Triplet2
N	In	V2- Triplet1
P	In	V2+ Triplet1
R	In	V1- Triplet1
S	In	V1+ Triplet1
T	In	V0- Triplet1
U	In	V0+ Triplet1
V	In	V2- Triplet0
W	In	V2+ Triplet0
X	In	V1- Triplet0
Y	In	V1+ Triplet0
Z	In	V0- Triplet0
a	In	V0+ Triplet0
b	Out	Recalage Masses 5V
c	Out	Calibration
d		GND ANALOG
e		SHIELD
f		GND
g		Power supply
h		Power supply
j		GND

## A.6 GPS

Reference: 851-06EC-10-6P50 (6 pins)

Connector Pin	Osiris In/Out	Label
A	Out	TxD
B		GND
C	In	RxD
D	In	1pps
E	Out	Remote
F	Out	Fused PowerSupply (2A)

## B Summary of the Osiris parameters

The following table describes the parameters as seen from the osh command line. The osh web interface provides an easier access to the configuration.

Name	Type	Range	Default
<i>Duration (s) of the LEDS activity after a knock on the DAS and at boot time:</i>			
LedsOnDuration	N	10-*	300
<i>Assignment of physical channels to logical channels. A value of 24 turns the logical channel off. This allows to register the same physical channel with different sampling rates:</i>			
LogicalChannel0-23	N	0-23,24	1:1
<i>Sampling rate for the logical channels</i>			
FsChannel0-23	N	10-1000	500
<i>Short term average window length used for trigger (s):</i>			
KStaChannel0-23	N	0.01-3600	0.3
<i>Long term average window length used for trigger (s):</i>			
KLtaChannel0-23	N	0.01-3600	10
<i>Threshold ratio STA/LTA used for trigger:</i>			
ThresholdChannel0-23	N	1-128	4
<i>Gain index for each channel. The gains are factory defined on user request:</i>			
Gain0-23	N	0-3	0
<i>Station name:</i>			
StationName	A	*	HOSTID
<i>Network name (for SeedLink):</i>			
NetworkName	A	*	AG
<i>Channel names (for SeedLink):</i>			
SeedChannel0-23	A	*	CH0-23
<i>Location names (for SeedLink):</i>			
LocationName0-23	A	*	00
<i>Maximum length (s) of the data files (unused):</i>			
FileDuration	N	120-3600	120 (fixed)
<i>Recording mode: based on STA/LTA, preconfigured time window or external pulse:</i>			
RecordingMode	A	stalta/window/extern/continuous	continuous
<i>What to do when the storage disk is full (cycle/stop/backup):</i>			
StoragePolicy	A	*	cycle
<i>Duration (s) of signal registered before a triggered event:</i>			
PreEvent	N	0-30	10
<i>Duration (s) of signal registered after a triggered event:</i>			
PostEvent	N	0-*	120
<i>Bit mask defining which channels are used to trigger events:</i>			
TriggerChannelMask	N	0x0fff	0
<i>Activate the slave trigger mode ?</i>			
slaveTrigger	A	true/false	false
<i>Activate the master trigger mode ?</i>			
masterTrigger	A	true/false	false

Name	Type	Range	Default
<i>Right shift of the data before beeing sent to the monitor (division by <math>2^{**}MonitorShift</math>):</i>			
MonitorShift	N	0-23	0
<i>Bit mask defining which channels are to be sent to the monitor:</i>			
MonitorChannels	N	0x0fff	0
<i>Monitored data type (0=MinMax, 1=LTA, 2=data):</i>			
MonitorType	N	0-2	0
<i>How long should the radio be powered (s):</i>			
RadioMaxDuration	N	0(forever)-86400	0(forever)
<i>How often should the radio be powered on a day:</i>			
RadioCycle	N	0(no cycle)-96	24(each hour)
<i>How long should the GPS be powered (s):</i>			
GPSMaxDuration	N	0(forever)-86400	600
<i>How long should the GPS sleep (s):</i>			
GPSSleepTime	N	0(forever)-86400	3600
<i>How many pulses should be received by the GPS:</i>			
GPSMinPulses	N	0(infinity)-*	5
<i>Should the GPS be powered when a tily occurs ?</i>			
GPSONTilt	A	on/off	on
<i>Should the WWW interface start in triplet mode ?</i>			
TripletMode	N	0(no)/1(yes)	3600

## C Uploading the ARM software

The binary package of the Osiris software are distributed as compressed tar archives containing all the necessary tools.

```
tar xvzf Package-name.tgz
cd Package-directory
```

During the first boot following an upgrade of the Osiris system, the flash storage area is formatted to ensure that the system starts in a clean state. All the configuration parameters are reset to their default value, the task list is lost, as well as any modified network parameters.

Note that this first boot takes about 3 minutes.

After this boot, the DAS is reachable using the IP addresses written on the top of the case.

### C.1 Using the serial line (Linux-i386 only)

The update of the Osiris software is quite simple: just plug the serial cable between your computer and the Osiris DAS (connector 'ppp'), start the script flash givin the appropriate serial port as unique argument, and carefully follow the instructions. The upload can be performed using both ethernet and serial cable (fast) or only the serial cable (slow).

Example:

```
./flash /dev/ttyS0
```

or

```
./flash /dev/ttyS0 serial
```

for the serial-only upload.

When the script asks for the DAS to be turned on, press on the 'ARM Upload' key on the DAS and plug the main battery cable. The 'ARM Upload' can be released as soon as the process has been initiated. After the end of the upload process, the station must be physically turned off and the user should wait a few seconds before turning on the station.

Be sure no other process is using the serial line on the computer.

If the first step of the upload process fails, unplug the serial cable, switch the DAS off and restart.

## C.2 Using osh

The ARM upload procedure can also be done on a living DAS running osh.

```
./oUpload osiris_IP_address
```

This command connects to the specified Osiris host, and transfers the images. When the transfer is finished, the DAS is rebooted within 30 seconds. The command must be started in the directory where reside rootfs.img and kernel.img. If for any reason this process fails, use the serial line method to upgrade the Osiris DAS.

Upgrading from version 15 or later will preserve the network configuration, parameters and task list.

## C.3 Using a disk

Connect an Osiris disk containing the files rootfs.img and kernel.img in the the top directory and wait for the reboot.

Upgrading from version 15 or later will preserve the network configuration, parameters and task list.

## D Filters

The first filter applies for downsampling the data from 16kHz to 2kHz. It is defined by 128 coefficients given in file *dec8.dat*. Then, the user sampling frequency is reached by applying decimators by 5 and 2 (in this order) defined by the coefficients given in files *dec5.dat* and *dec2.dat* (resp.).



## E Logfiles

The Osiris system maintains three log files that are all managed in the same way: the more recent part of the log resides on the flash/ram filesystem, and the older part is stored on the storage device. The length of the log file on the storage device cannot be more than 10Mb. When this limit is reached, the file are truncated and only the more recent 5Mb are kept.

### E.1 Osiris log file

The types of event logged in this file are STATUS, DISK, and GPS. Periodically, a title line is issued, explaining the format of each type of event. Note that the informations published in the osiris.log since instantaneous since they are obtained from the various subsystems of Osiris when the line is added to the file.

```
2005/11/11-12:11:56 #STATUS: CPU EXTBATT INTBATT TEMP ENVO ENV1 \
                        ENV2 ENV3 ENV4
2005/11/11-13:26:23 #DISK: ST.SN ST.TOTAL ST.FREE FL.TOTAL FL.FREE \
                        THROUGHPUT ST.MOUNTED FLUSH RADIO
2005/11/09-17:00:00 #GPS: POWER INUSE/INVIEW LAT LON ALT PDOP HDOP \
                        VDOP TDOP QUAL/VALID STATE
```

- STATUS line (frequency: about once per minute)
  - CPU: cpu load
  - EXTBATT: external battery voltage
  - INTBATT: internal battery voltage
  - TEMP: station temperature (when applicable)
  - ENV0-ENV4: environnemental channel 0-4 (when applicable)
- DISK line (frequency: about once per 5 minutes)
  - ST.SN: storage device serial number
  - ST.TOTAL: storage device total size (1Kbyte blocks)
  - ST.FREE: storage device free space (1Kbyte blocks)
  - FL.TOTAL: flash device total size (1Kbyte blocks)
  - FL.FREE: flash device free space (1Kbyte blocks)

- THROUGHPUT: data throughput
- ST.MOUNTED: storage device mount state
- FLUSH: is a flush running ?
- RADIO: is a wireless card present ?
- GPS line (frequency: about once per 5 minutes)
  - POWER: GPS power state
  - INUSE/INVIEW: number of stellites used and viewed
  - LAT, LON, ALT: location reported by the GPS receiver
  - PDOP, HDOP, VDOP, TDOP: dilution of precision for position, horizontal position, vertical position, time (resp.)
  - QUAL/VALID: flag (0:1) indicating that position quality is considered good and time valid
  - STATE: GPS receiver state

Please note that the GPS line reports the instantaneous position, in order to get the averaged position, use the 'gps' command in osh and refer to the AvgLat, AvgLon, and AvgAlt fields.

## E.2 System messages file

The system messages file collects all the syslog-generated messages as well as some messages generated by the kernel. Some of the Osiris processes use syslog to generate error or debug messages. This file should not be used for normal operations.

## Change history

20060919seb	updated the power consumption for the new input stage
20060912seb	version 010 tcxo adjustment and FTP client added
20060808seb	pinout of the GPS was wrong (Rx/Tx)
20060303seb	version 007.
20060207seb	mention minicom/hyperterminal for console login
20060104seb	corrected the connector reference
20051227seb	"data extract=auto"
20051219seb	final version 005
20051010seb	updates for version 005, added logfiles
20050929seb	updated for version 004
20050408seb	mention the 36-36000Hz limitation
20050407seb	start of history
20050407seb	added the 12channel connector pinout
20050407seb	quickconf: specification of the external trigger signal
20050509seb	quickconf: note about FW and '-set' option in nrtcd